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some other differences have been found which may have a bearing on the relation of these two types of spectra to one another. The principal differences may be summarized briefly as follows: the well-known N type star, B. D. + 25° 205 is taken as representative of this class.

	^{2 1 5 6} B. D. + 25° 205 (N)	^{H.D. 173440} B. D. — 10° 5057 (R)
"Carbon" heads 4554, 4606...	Very strong	Trace
λ 4744, 4934	" "	Absent
λ 4227 (Ca)	" "	Weak
Arc lines of Ti and V.....	Strong	"
(Strong in sun-spots.)		
Enhanced lines of Fe and Ti.	Weak	Strong
(Weak in sun-spots.)		
Chromospheric lines λ 4215,		
λ 4233	Weak	Very strong.

It is evident that these differences, tho greater in amount, are very similar to those found between the spectrum of sun-spots and that of the Sun. The intensity of the violet portion of the continuous spectrum, the strength of the chromospheric and the enhanced lines, and the weakness of the low temperature lines such as λ 4227 of calcium, all point to the probability of a distinctly higher temperature for the R type stars.

WALTER S. ADAMS.

RADIAL VELOCITIES OF SIX NEBULÆ.

Spectrograms of the following nebulæ have been taken with the 60-inch Cassegrain spectrograph in which a 64° O 102 prism and camera of 7 inches focal length were used. The scale is $H\gamma - K = 7^{\text{mm}}$.

The plates were measured by Mr. ADAMS and values given are reduced to the Sun.

1. *Dumbbell Nebula*.—The slit was set on the brightest knot in the nebula about $1\frac{3}{4}$ minutes of arc *sp* the nucleus. The exposure was $32\frac{1}{2}$ hours, extending over five nights. Four strong bright lines show; 5007, 4959, $H\beta$ $H\gamma$; no continuous spectrum shows. The radial velocity is -63^{km} .

2. *Messier 33*.—The slit was set on the brightest knot in the nebula about 10 minutes *nf* the nucleus. The exposure was $34\frac{1}{2}$ hours. Three bright lines only appear, 5007, $H\beta$, $H\gamma$. The radial velocity is -278^{km} .

3. *N. G. C. 7023*—*a*) 7th mag. star involved in nebulosity. The radial velocity for the nucleus given by four absorption lines is $+0.7^{\text{km}}$. *b*). Two spectrograms of the nucleus obtained with the slit spectrograph in the primary focus of the 60-inch reflector and with the slit (p-f) 13.6 seconds of arc north of the nucleus both show the same strong continuous spectrum crossed by absorption lines.

4, 5, 6. *N. G. C. 6572*, *N. G. C. 6826*, *N. G. C. 6891*.—Planetary nebulae. Radial velocities are:—

<i>N. G. C. 6572</i> (9 lines).....	-12^{km}
<i>N. G. C. 6826</i> (5 lines).....	-8
<i>N. G. C. 6891</i> (6 lines).....	$+38$

The values which KEELER obtained for these nebulae as mentioned by CAMPBELL in "Stellar Motions," p. 210, are:—

<i>N. G. C. 6572</i>	-9.7
<i>N. G. C. 6826</i>	-5.3
<i>N. G. C. 6891</i>	$+40.7$

WRIGHT'S values of nebular wave-lengths were used.

FRANCIS G. PEASE.

FAINT STAR WITH LARGE PROPER MOTION.

Three pairs of plates taken in 1914 and 1915 of the region of Pi. $2^{\text{h}} 123$ ($\alpha \doteq 2^{\text{h}} 30^{\text{m}} 36^{\text{s}}$, $\delta = +6^{\circ} 25'$, 1900) show a star of about the 12th magnitude, $2'.6$ East, $0'.9$ South, having a proper motion of $2''.63$ in $p = 48^{\circ}.9$, which is nearly the same as that of the principal star ($2''.34$ in $p 51^{\circ}.8$).

Assuming the parallax of the faint star to be the same as that of Pi. $2^{\text{h}} 123$, which is given in *Publication of the Astronomical Laboratory at Groningen*, No. 24, as $+0''.143$, the absolute magnitude (apparent magnitude at a distance corresponding to parallax $0''.1$) of the faint star is about 13.

A. VAN MAANEN.

RADIAL VELOCITIES OF THE PLANETARY AND IRREGULAR NEBULÆ.

The discovery in 1910 that stellar radial velocities increase in general with advancing spectral class has led to the extension of the observing program to include the gaseous planetary and extended nebulae whose spectra are composed of bright